



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

## CALCULUS.

---

172. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, O.

$$\text{Solve } x \frac{dy}{dx} = \frac{y}{y^{-1} - \log x}.$$

Solution by W. W. BEMAN, A. M., Professor of Mathematics at the University of Michigan, Ann Arbor, Mich.

Writing the equation in the form  $y \frac{dx}{x} + \log x \, dy = \frac{dy}{y}$ , we get  $y \log x = \log y$ , or,  $x^y = c y$ .

Also solved by G. W. Droke, Fayetteville, Ark.; M. E. Graber, A. B., Instructor in Mathematics and Physics, Heidelberg University, Tiffin, O.; O. W. Anthony, DeWitt Clinton High School, New York City; G. W. Greenwood, B. A. (Oxon), Professor of Mathematics and Astronomy, McKendree College, Lebanon, Ill.; G. B. M. Zerr, A. M., Ph. D., Parsons, W. Va.

---

## MECHANICS.

---

161. Proposed by W. J. GREENSTREET, A. M., Editor of The Mathematical Gazette, Stroud, England.

Four equal uniform smoothly jointed rods length  $a$ , and width  $w$ , form a rhombus  $ABCD$ ,  $A$  and  $C$  being in contact with two vertical walls  $b$  feet apart. An elastic string, natural length  $x$ , modulus  $\lambda$ , keeps the figure in position. The angle of friction at  $A$  and  $C$  is  $\tan^{-1} p$ . When the rhombus is just about to slip, find the angle  $A$ , and the angle between  $AB$  and the vertical.

Solution by G. B. M. ZERR, A. M., Ph. D., Parsons, W. Va.

Suppose the rhombus to be held in form by two strings  $AC, BD$  in a state of tension and that the rhombus is in a plane perpendicular to the walls. Let  $T, T'$  be the tensions in  $BD, AC$ ; then the virtual work  $T' \cdot \delta AC + T \cdot \delta BD = 0$ .

$$\text{But } AC^2 + BD^2 = 4a^2, \therefore AC \cdot \delta AC + BD \cdot \delta BD = 0.$$

$$\therefore T \cdot BD = T' \cdot AC \text{ or } T = T' \cdot AC / BD.$$

Let  $BD$  make an angle  $\theta$  with the vertical. Then  $b = AC \cos \theta$  or  $AC = b \sec \theta$ ,  $BD = x(1 + T/\lambda) = x_1$ . Let  $R, S$  be the reactions at  $A, C$ . Revolving horizontally,  $R + S = 2T' \cos \theta$ . Revolving vertically,  $(R + S)p = 4w$ .

$$\therefore T' = \frac{2w}{p \cos \theta} = \frac{Tb \sec \theta}{x_1} \text{ or } T = \frac{2wx_1}{pb}.$$

$$\therefore x_1 = x \left( 1 + \frac{2wx_1}{pb\lambda} \right) \text{ or } x_1 = \frac{pb\lambda x}{pb\lambda - 2wx}.$$

$x_1 = 2a \sin \frac{1}{2}A$  or  $A = 2 \sin^{-1}(x_1/2a)$ .  $AB$  makes with the vertical an angle  $\frac{1}{2}B + \theta = \frac{1}{2}\pi - \frac{1}{2}A + \theta$ .

162. Proposed by B. F. FINKEL, A. M., M. Sc., Professor of Mathematics and Physics, Drury College, Springfield, Mo.

Show that the velocity,  $v$ , of a wave along the surface of a liquid whose